CONTENTS TO VOLUME 51

PART 1 11 JANUARY 1972

Supersonic laminar boundary layer near the plane of symmetry of a cone at incidence. BERNARD ROUX *page* 1

The structure and stability of vortex rings. T. MAXWORTHY 15

On some exact solutions in magnetohydrodynamics with astrophysical applications. C. SOZOU 33

Numerical studies of the stability of inviscid stratified shear flows. PHILIP HAZEL 39

The cumulants of the distribution of concentration of a solute dispersing in solvent flowing in a tube. P. C. CHATWIN 63

On the noise of a nearly ideally expanded supersonic jet. CHRISTOPHER K. W. TAM 69

The entrainment interface. O. M. PHILLIPS 97

Examples of steady vortex rings of small cross-section in an ideal fluid. L. E. FRAENKEL 119

The unsteady laminar boundary layer on a semi-infinite flat plate due to small fluctuations in the magnitude of the free-stream velocity. R. C. ACKERBERG and J. H. PHILLIPS 137

An experimental and theoretical study of internal waves generated by the collapse of a two-dimensional mixed region in a density gradient. A. H. SCHOOLEY and B. A. HUGHES 159

Transition to turbulence in pipe flow for water and dilute solutions of polyethylene oxide. R. W. PATERSON and F. H. ABERNATHY 177

Gas and solids motion around deformed and interacting bubbles in fluidized beds. R. CLIFT, J. R. GRACE, L. CHEUNG and T. H. DO 187

REVIEWS

The Scientific Papers of Sir Geoffrey Ingram Taylor, Volume IV 206

Shock Tubes: Proceedings of the 7th International Shock Tube Symposium, Toronto, Canada 1969, *edited by I. I. Glass* 208

PART 2 25 JANUARY 1972

Surface waves in flowing water. CHIA-SHUN YIH 209

Cavity flows driven by buoyancy and shear. K. TORRANCE, R. DAVIS, K. EIKE, P. GILL, D. GUTMAN, A. HSUI, S. LYONS and H. ZEIN 221

The stability of an incompressible two-dimensional wake. G. E. MATTINGLY and W. O. CRIMINALE 233

Slow flow through stationary random beds and suspensions of spheres. T. S. Lundgren *page* 273

Fully developed asymmetric flow in a plane channel. K. Hanjalić and B. E. Launder 301

High Reynolds number flow past a flat plate with strong blowing. J. B. Klemp and A. Acrivos 337

Radiation from vortex filament motion near a half plane. D. G. Crighton 357

Laminar dispersion in curved tubes and channels. R. J. Nunge, T.-S. Lin and W. N. Gill 363

Hydrodynamic stability of surfactant solutions heated from below. Harvey J. Palmer and John C. Berg 385

The stability of plane Poiseuille flow between flexible walls. C. H. Green and C. H. Ellen 403

Part 3 8 February 1972

Numerical solution of the Navier-Stokes equations for symmetric laminar incompressible flow past a parabola. R. T. Davis 417

Quantitative schlieren measurements in a supersonic turbulent jet. M. R. Davis 435

Long wave generation on a sloping beach. E. O. Tuck and Li-San Hwang 449

Plasma motions in narrow capillary flow. J. M. Fitz-Gerald 463

A soliton on a vortex filament. Hidenori Hasimoto 477

Some comments on heat-transfer laws for fine wires. L. J. S. Bradbury and I. P. Castro 487

Fluid mechanics of the cochlea. Part 1. M. B. Lesser and D. A. Berkley 497

Nonlinear source-sink flow in a rotating pie-shaped basin. George Veronis and C. C. Yang 513

Two-dimensional free-surface gravity flow past blunt bodies. G. Dagan and M. P. Tulin 529

Turbulent boundary layer on a rotating helical blade. B. Lakshminarayana, A. Jabbari and H. Yamaoka 545

The use of the loaded-sphere molecular model for computer simulation of diatomic gases. W. K. Melville 571

On fluid motions induced by an electromagnetic field in a liquid drop immersed in a conducting fluid. C. Sozou 585

Global stability of spiral flow. Part 2. W. L. Hung, D. D. Joseph and B. R. Munson 593

Wake collapse in a stratified fluid: linear treatment. R. J. Hartman and H. W. Lewis 613

REVIEWS

Annual Review of Fluid Mechanics, Volume 3, edited by M. Van Dyke, W. G. Vincenti and J. V. Wehausen page 619

Übersichtsbeiträge zur Gasdynamik, edited by E. Leiter and J. Zierep 621

Modern Optical Methods in Gas Dynamic Research, edited by D. S. Dosanjh 621

Aerodynamic Characteristics of Atmospheric Boundary Layers, by Erich J. Plate 622

PART 4 22 FEBRUARY 1972

Solitary waves in concentrated vortices. S. LEIBOVICH and J. D. RANDALL 625

Convection in a rotating laterally-heated annulus. E. L. KOSCHMIEDER 637

An experiment on the adiabatic compressible turbulent boundary layer in adverse and favourable pressure gradients. J. E. LEWIS, R. L. GRAN and T. KUBOTA 657

Velocity measurements made with a laser dopplermeter on the turbulent pipe flow of a dilute polymer solution. M. J. RUDD 673

Hydrodynamic stability in plane Poiseuille flow with finite amplitude disturbances. W. D. GEORGE and J. D. HELLUMS 687

A nonlinear instability burst in plane parallel flow. L. M. HOCKING, K. STEWARTSON and J. T. STUART 705

The acoustics of turbulence near sound-absorbent liners. JOHN E. FFOWCS WILLIAMS 737

Wave-induced wind fluctuation over the sea. JUNSEI KONDO, YUKIO FUJINAWA and GEN'ICHI NAITO 751

Measurement of local entrainment rate in the initial region of axisymmetric turbulent air jets. B. J. HILL 773

REVIEW

The Measurement of Time-Varying Phenomena: Fundamentals and Applications, by E. B. Magrab and D. S. Blomquist 780

INDEX TO VOLUME 51 782

JOURNAL OF FLUID MECHANICS

JOURNAL OF FLUID MECHANICS

VOLUME 52
1972

CAMBRIDGE
AT THE UNIVERSITY PRESS
1972

PUBLISHED BY
THE SYNDICS OF THE CAMBRIDGE UNIVERSITY PRESS
Bentley House, 200 Euston Road, London NW1 2DB
American Branch: 32 East 57th Street, New York, N.Y. 10022

© Cambridge University Press, 1972

Printed in Great Britain at the University Printing House, Cambridge

CONTENTS TO VOLUME 52

PART 1 14 MARCH 1972

The Stokes-flow drag on prolate and oblate spheroids during axial translatory accelerations. ROBERT Y. S. LAI and LYLE F. MOCKROS *page* 1

Super-Alfvénic supersonic flow over a cone in aligned fields. LEE A. BERTRAM and Y. M. LYNN 17

Second-order Cowley–Imai analogy in magnetogasdynamics. LEE A. BERTRAM and Y. M. LYNN 33

On a class of magneto-convective boundary-layer flows. ZEËV ROTEM 43

An experimental and analytical study of natural convection with appreciable thermal radiation effects. T. AUDUNSON and B. GEBHART 57

The oscillatory instability of convection rolls in a low Prandtl number fluid. F. H. BUSSE 97

The reattachment and relaxation of a turbulent shear layer. P. BRADSHAW and F. Y. F. WONG 113

An experimental study of the velocity distribution and transition to turbulence in the aorta. R. M. NEREM, W. A. SEED and N. B. WOOD 137

Flow patterns in models of small airway units of the lung. M. R. DAVIDSON and J. M. FITZ-GERALD 161

On the interaction of surface and internal waves. A. E. GARGETT and B. A. HUGHES 179

Propagation of internal gravity waves in perfectly conducting fluids with shear flow, rotation and transverse magnetic field. N. RUDRAIAH and M. VENKATACHALAPPA 193

REVIEW

A History and Philosophy of Fluidmechanics, by G. A. Tokaty 207

PART 2 28 MARCH 1972

On Long's hypothesis of no upstream influence in uniformly stratified or rotating flow. MICHAEL E. MCINTYRE 209

Sedimentation in a dilute dispersion of spheres. G. K. BATCHELOR 245

Note on the stability of a boundary layer on a concave wall with suction. RYŌJI KOBAYASHI 269

Finite amplitude instability of second-order fluids in plane Poiseuille flow. LARRY V. MCINTIRE and C. H. LIN 273

On prediction of the turbulent flow over a wavy boundary. Russ E. Davis *page* 287

Flow separation at the upstream edge of a square-edged broad-crested weir. W. D. Moss 307

Variational properties of steady fall in Stokes flow. H. F. Weinberger 321

Statistical hydromechanics of disperse systems. Part 2. Solution of the kinetic equation for suspended particles. Yu. A. Buyevich 345

Boundary-layer velocity profiles in a swirling convergent flow field. T. M. Houlihan and D. J. Hornstra 357

Propagation of a blast wave in uniform or non-uniform media: a uniformly valid analytic solution. P. L. Sachdev 369

Nonlinear Kelvin and continental-shelf waves. Ronald Smith 379

An instability of internal gravity waves. Ronald Smith 393

Part 3 11 April 1972

Experimental investigations of the stability of channel flows. Part 2. Two-layered co-current flow in a rectangular channel. Timothy W. Kao and Cheol Park 401

An experimental study of turbulent separating and reattaching flows at a high Mach number. J. P. Batham 425

Unsteady transonic flows in two-dimensional channels. T. C. Adamson 437

Laminarization of turbulent pipe flow by fluid injection. W. T. Pennell, E. R. G. Eckert and E. M. Sparrow 451

Dynamic calibration of inclined and crossed hot wires. G. L. Morrison, A. E. Perry and A. E. Samuel 465

Physiological fluid dynamics: a survey. M. J. Lighthill 475

An experiment on the stability of small disturbances in a stratified free shear layer. R. S. Scotti and G. M. Corcos 499

On the hydromagnetic stability of a rotating fluid annulus. D. J. Acheson 529

Some effects of intense turbulence on the aerodynamics of a circular cylinder at subcritical Reynolds number. David Surry 543

On the breakup of accelerating liquid drops. E. Y. Harper, G. W. Grube and I-Dee Chang 565

The collection efficiencies of small droplets falling through a sheared air flow. P. R. Jonas and P. Goldsmith 593

PART 4 25 APRIL 1972

A Reynolds stress model of turbulence and its application to thin shear flows. K. HANJALIĆ and B. E. LAUNDER *page* 609

The tearing of an adhesive layer between flexible tapes pulled apart. A. S. WILLIAMSON 639

A parametric study of self-similar blast waves. A. K. OPPENHEIM, A. L. KUHL, E. A. LUNDSTROM and M. M. KAMEL 657

The effect of Brownian motion on the rheological properties of a suspension of non-spherical particles E. J. HINCH and L. G. LEAL 683

Nonlinear gravity waves on steady non-uniform currents. G. D. CRAPPER 713

On the rippling of small waves: a harmonic nonlinear nearly resonant interaction. L. F. MCGOLDRICK 725

On generalized-vortex boundary layers. R. J. BELCHER, O. R. BURGGRAF and K. STEWARTSON 753

The force distribution on a slender twisted particle in a Stokes flow. N. S. CLARKE 781

REVIEWS

The Theory of Rotating Fluids, by H. P. Greenspan 794

Thin Liquid Films and Boundary Layers, published for the Faraday Society 795

SHORTER NOTICES

Fluid Mechanics for Engineers, 3rd edition, S. I. version, by P. S. Barna 796

Fluid Power for Technicians, by D. G. Newton 796

Shock Tube Research, edited by J. L. Stollery, A. G. Gaydon and P. R. Owen 797

Fluid Mechanics for Civil Engineers, S. I. edition, by N. B. Webber 797

Research in the Antarctic, edited by L. O. Quam 797

INDEX TO VOLUME 52 798

JOURNAL OF FLUID MECHANICS

VOLUME 53
1972

CAMBRIDGE
AT THE UNIVERSITY PRESS
1972

PUBLISHED BY
THE SYNDICS OF THE CAMBRIDGE UNIVERSITY PRESS
Bentley House, 200 Euston Road, London NW1 2DB
American Branch: 32 East 57th Street, New York, N.Y. 10022

© Cambridge University Press, 1972

Printed in Great Britain at the University Printing House, Cambridge

CONTENTS TO VOLUME 53

PART 1 9 MAY 1972

The long-distance propagation of shallow water waves over an ocean of random depth. JOHN F. ELTER and JOHN E. MOLYNEUX *page* 1

The excitation of resonant triads by single internal waves. SEELYE MARTIN, WILLIAM SIMMONS and CARL WUNSCH 17

A note on von Kármán's constant in low Reynolds number turbulent flows. G. DAVID HUFFMAN and PETER BRADSHAW 45

Large-scale motion of a turbulent boundary layer during relaminarization. RON F. BLACKWELDER and LESLIE S. G. KOVASZNAY 61

The internal structure of shock waves. BRUCE L. HICKS, SHEE-MANG YEN and BARBARA J. REILLY 85

Turbulent hypersonic flow at a wedge-compression corner. G. M. ELFSTROM 113

Viscous flow near a corner in three dimensions. N. TOKUDA 129

Non-equilibrium dissociating nitrogen flow over spheres and circular cylinders. H. G. HORNUNG 149

A method for integrating the boundary-layer equations through a region of reverse flow. J. B. KLEMP and ANDREAS ACRIVOS 177

PART 2 23 MAY 1972

On a model representation for certain spatial-resonance phenomena. J. J. MAHONY and RONALD SMITH 193

Observations on a spatial-resonance phenomenon. IAN HUNTLEY 209

On the energy deficiency in self-preserving convective flows. J. S. TURNER 217

The flow and stability of thin liquid films on a rotating disk. A. F. CHARWAT, R. E. KELLY and C. GAZLEY 227

A ninth-order solution for the solitary wave. JOHN FENTON 257

Kelvin wave attenuation along nearly straight boundaries. H. G. PINSENT 273

Jets induced by oscillatory motion. B. J. DAVIDSON and N. RILEY 287

Thermal instabilities in two-fluid horizontal layers. RICHARD W. ZEREN and WILLIAM C. REYNOLDS 305

Two-dimensional sink flow of a stratified fluid contained in a duct. JORG IMBERGER *page* 329

Microscale pressure fluctuations measured within the lower atmospheric boundary layer. J. A. ELLIOTT 351

An approach to a dynamic theory of dynamo action in a rotating conducting fluid. H. K. MOFFATT 385

REVIEW

Thermodynamic Theory of Structure, Stability and Fluctuations, by P. Glansdorff and I. Prigogine 400

PART 3 13 JUNE 1972

The critical level for hydromagnetic waves in a rotating fluid. D. J. ACHESON 401

A unified kinetic theory approach to external rarefied gas flows. Part 1. Derivation of hydrodynamic equations. H. ATASSI and S. F. SHEN 417

A unified kinetic theory approach to external rarefied gas flows. Part 2. Application to a steady low-speed motion past a circular cylinder. H. ATASSI and S. F. SHEN 433

Some measurements of the distortion of turbulence approaching a two-dimensional bluff body. P. W. BEARMAN 451

Some variational methods in the theory of turbulent diffusion. R. PHYTHIAN 469

On the movement of water and solute in extracellular channels with filtration, osmosis and active transport. SHELDON WEINBAUM and J. RICHARD GOLDGRABEN 481

Flow of a stratified fluid in a wavy channel. A. RAMACHANDRA RAO and RATHNA DEVANATHAN 513

The effect of a density difference on shear-layer instability. ROBERT F. DAVEY and ANATOL ROSHKO 523

On hydromagnetic spin-up. S. S. CHAWLA 545

Internal waves in a sheeted thermocline. JOHN W. MILES 557

The influence of drag-reducing polymers on turbulence in the viscous sublayer. GILEAD FORTUNA and THOMAS J. HANRATTY 575

REVIEWS

Mechanics of Fluids, by J. W. Ireland *page* 587

A Textbook on Hydraulics and Fluid Mechanics, Volume I, *by V. G. Garde and R. M. Advani* 587

Elements of Fluid Mechanics, by C. V. Seshadri and S. V. Patankar 587

Hydronautics, edited by H. E. Sheets and V. T. Boatwright 589

Flowing Gas–Solids Suspensions, by R. G. Boothroyd 591

PART 4 27 JUNE 1972

An experimental investigation of an asymmetrical turbulent wake. M. D. PALMER and J. F. KEFFER 593

On the structure of hypersonic turbulent boundary layers. F. K. OWEN and C. C. HORSTMAN 611

On the calculation of wave patterns. C. HUNTER 637

The flow caused by the differential rotation of a right circular cylindrical depression in one of two rapidly rotating parallel planes. M. R. FOSTER 647

Eigenvalue bounds in linear inviscid stability theory. ALEX D. D. CRAIK 657

Mass transport mechanisms in partially stratified estuaries. HUGO B. FISCHER 671

Axisymmetric rotating flow past a circular disk. JOHN W. MILES 689

Analysis of the swimming of elastic slender bodies excited by an external force. A. M. LAVIE 701

Thermocapillary flow near a hemispherical bubble on a heated wall. Y. S. KAO and D. B. R. KENNING 715

The response of a turbulent boundary layer to a step change in surface roughness. Part 2. Rough-to-smooth. R. A. ANTONIA and R. E. LUXTON 737

Effects of the lower boundary on the head of a gravity current. JOHN E. SIMPSON 759

The propagation of a weak nonlinear wave. A. DAVEY 769

INDEX TO VOLUME 53 782

INDEX

ABERNATHY, F. H. *See* PATERSON & ABERNATHY

ACKERBERG, R. C. & PHILLIPS, J. H. The unsteady laminar boundary layer on a semi-infinite flat plate due to small fluctuations in the magnitude of the free-stream velocity, 137

ACRIVOS, A. *See* KLEMP & ACRIVOS

BERG, JOHN C. *See* PALMER & BERG

BERKLEY, D. A. *See* LESSER & BERKLEY

BRADBURY, L. J. S. & CASTRO, I. P. Some comments on heat-transfer laws for fine wires, 487

CASTRO, I. P. *See* BRADBURY & CASTRO

CHATWIN, P. C. The cumulants of the distribution of concentration of a solute dispersing in solvent flowing in a tube, 63

CHEUNG, L. *See* CLIFT, GRACE, CHEUNG & DO

CLIFT, R., GRACE, J. R., CHEUNG, L. & DO, T. H. Gas and solids motion around deformed and interacting bubbles in fluidized beds, 187

CRIGHTON, D. G. Radiation from vortex filament motion near a half plane, 357

CRIMINALE, W. O. *See* MATTINGLY & CRIMINALE

DAGAN, G. & TULIN, M. P. Two-dimensional free-surface gravity flow past blunt bodies, 529

DAVIS, M. R. Quantitative schlieren measurements in a supersonic turbulent jet, 435

DAVIS, R. *See* TORRANCE *et al.*

DAVIS, R. T. Numerical solution of the Navier–Stokes equations for symmetric laminar incompressible flow past a parabola, 417

DO, T. H. *See* CLIFT, GRACE, CHEUNG & DO

EIKE, K. *See* TORRANCE *et al.*

ELLEN, C. H. *See* GREEN & ELLEN

FFOWCS WILLIAMS, JOHN E. The acoustics of turbulence near sound-absorbent liners, 737

FITZ-GERALD, J. M. Plasma motions in narrow capillary flow, 463

FRAENKEL, L. E. Examples of steady vortex rings of small cross-section in an ideal fluid, 119

FUJINAWA, YUKIO. *See* KONDO, FUJINAWA & NAITO

GEORGE, W. D. & HELLUMS, J. D. Hydrodynamic stability in plane Poiseuille flow with finite amplitude disturbances, 687

GILL, P. *See* TORRANCE *et al.*

GILL, W. N. *See* NUNGE, LIN & GILL

GRACE, J. R. *See* CLIFT, GRACE, CHEUNG & DO

GRAN, R. L. *See* LEWIS, GRAN & KUBOTA

GREEN, C. H. & ELLEN, C. H. The stability of plane Poiseuille flow between flexible walls, 403

GUTMAN, D. *See* TORRANCE *et al.*

HANJALIĆ, K. & LAUNDER, B. E. Fully developed asymmetric flow in a plane channel, 301

HARTMAN, R. J. & LEWIS, H. W. Wake collapse in a stratified fluid: linear treatment, 613

HASIMOTO, HIDENORI. A soliton on a vortex filament, 477

HAZEL, PHILIP. Numerical studies of the stability of inviscid stratified shear flows, 39

HELLUMS, J. D. *See* GEORGE & HELLUMS

HILL, B. J. Measurement of local entrainment rate in the initial region of axisymmetric turbulent air jets, 773

HOCKING, L. M., STEWARTSON, K. & STUART, J. T. A nonlinear stability burst in plane parallel flow, 705.

HSUI, A. *See* TORRANCE *et al.*

HUGHES, B. A. *See* SCHOOLEY & HUGHES

HUNG, W. L., JOSEPH, D. D. & MUNSON, B. R. Global stability of spiral flow. Part 2, 593

HWANG, LI-SAN. *See* TUCK & HWANG

JABBARI, A. *See* LAKSHMINARAYANA, JABBARI & YAMAOKA

JOSEPH, D. D. *See* HUNG, JOSEPH & MUNSON

KLEMP, J. B. & ACRIVOS, A. High Reynolds number flow past a flat plate with strong blowing, 337

KONDO, JUNSEI, FUJINAWA, YUKIO & NAITO, GEN'ICHI. Wave-induced wind fluctuation over the sea, 751

KOSCHMIEDER, E. L. Convection in a rotating laterally-heated annulus, 637

KUBOTA, T. *See* LEWIS, GRAN & KUBOTA

LAKSHMINARAYANA, B., JABBARI, A. & YAMAOKA, H. Turbulent boundary layer on a rotating helical blade, 545

LAUNDER, B. E. *See* HANJALIĆ & LAUNDER

LEIBOVICH, S. & RANDALL, J. D. Solitary waves in concentrated vortices, 625

LESSER, M. B. & BERKLEY, D. A. Fluid mechanics of the cochlea. Part 1, 497

LEWIS, H. W. *See* HARTMAN & LEWIS

LEWIS, J. E., GRAN, R. L. & KUBOTA, T. An experiment on the adiabatic compressible turbulent boundary layer in adverse and favourable pressure gradients, 657

LIN, T.-S. *See* NUNGE, LIN & GILL

LUNDGREN, T. S. Slow flow through stationary random beds and suspensions of spheres, 273

LYONS, S. *See* TORRANCE *et al.*

MATTINGLY, G. E. & CRIMINALE, W. O. The stability of an incompressible two-dimensional wake, 233

MAXWORTHY, T. The structure and stability of vortex rings, 15

MELVILLE, W. K. The use of the loaded-sphere molecular model for computer simulation of diatomic gases, 571

MUNSON, B. R. *See* HUNG, JOSEPH & MUNSON

NAITO, GEN'ICHI. *See* KONDO, FUJINAWA & NAITO

NUNGE, R. J., LIN, T.-S. & GILL, W. N. Laminar dispersion in curved tubes and channels, 363

PALMER, HARVEY J. & BERG, JOHN C. Hydrodynamic stability of surfactant solutions heated from below, 385

PATERSON, R. W. & ABERNATHY, F. H. Transition to turbulence in pipe flow for water and dilute solutions of polyethylene oxide, 177

PHILLIPS, J. H. *See* ACKERBERG & PHILLIPS

PHILLIPS, O. M. The entrainment interface, 97

RANDALL, J. D. *See* LEIBOVICH & RANDALL

ROUX, BERNARD. Supersonic laminar boundary layer near the plane of symmetry of a cone at incidence, 1

RUDD, M. J. Velocity measurements made with a laser dopplermeter on the turbulent pipe flow of a dilute polymer solution, 673

SCHOOLEY, A. H. & HUGHES, B. A. An experimental and theoretical study of internal waves generated by the collapse of a two-dimensional mixed region in a density gradient, 159

SOZOU, C. On some exact solutions in magnetohydrodynamics with astrophysical applications, 33

SOZOU, C. On fluid motions induced by an electromagnetic field in a liquid drop immersed in a conducting fluid, 585

STEWARTSON, K. *See* HOCKING, STEWARTSON & STUART

STUART, J. T. *See* HOCKING, STEWARTSON & STUART

TAM, CHRISTOPHER K. W. On the noise of a nearly ideally expanded supersonic jet, 69

TORRANCE, K., DAVIS, R., EIKE, K., GILL, P., GUTMAN, D., HSUI, A., LYONS, S. & ZEIN, H. Cavity flows driven by buoyancy and shear, 221

TUCK, E. O. & HWANG, LI-SAN. Long wave generation on a sloping beach, 449

TULIN, M. P. *See* DAGAN & TULIN

VERONIS, GEORGE & YANG, C. C. Nonlinear source-sink flow in a rotating pie-shaped basin, 513

YAMAOKA, H. *See* LAKSHMINARAYANA, JABBARI & YAMAOKA

YANG, C. C. *See* VERONIS & YANG

YIH, CHIA-SHUN. Surface waves in flowing water, 209

ZEIN, H. *See* TORRANCE *et al.*

REVIEWS

The Scientific Papers of Sir Geoffrey Ingram Taylor, Volume IV, 206

Shock Tubes: Proceedings of the 7th International Shock Tube Symposium, Toronto, Canada 1969, *edited by I. I. Glass*, 208

Annual Review of Fluid Mechanics, Volume 3, *edited by M. Van Dyke, W. G. Vincenti and J. V. Wehausen*, 619

Übersichtsbeiträge zur Gasdynamik, edited by E. Leiter and J. Zierep, 621

Modern Optical Methods in Gas Dynamic Research, edited by D. S. Dosanjh, 621

Aerodynamic Characteristics of Atmospheric Boundary Layers, by Erich J. Plate, 622

The Measurement of Time-Varying Phenomena: Fundamentals and Applications, by E. B. Magrab and D. S. Blomquist, 780

INDEX

ACHESON, D. J. On the hydromagnetic stability of a rotating fluid annulus, 529

ADAMSON, T. C. Unsteady transonic flows in two-dimensional channels, 437

AUDUNSON, T. & GEBHART, B. An experimental and analytical study of natural convection with appreciable thermal radiation effects, 57

BATCHELOR, G. K. Sedimentation in a dilute dispersion of spheres, 245

BATHAM, J. P. An experimental study of turbulent separating and reattaching flows at a high Mach number, 425

BELCHER, R. J., BURGGRAF, O. R. & STEWARTSON, K. On generalized-vortex boundary layers, 753

BERTRAM, LEE A. & LYNN, Y. M. Super-Alfvénic supersonic flow over a cone in aligned fields, 17

BERTRAM, LEE A. & LYNN, Y. M. Second-order Cowley–Imai analogy in magnetogasdynamics, 33

BRADSHAW, P. & WONG, F. Y. F. The reattachment and relaxation of a turbulent shear layer, 113

BURGGRAF, O. R. *See* BELCHER, BURGGRAF & STEWARTSON

BUSSE, F. H. The oscillatory instability of convection rolls in a low Prandtl number fluid, 97

BUYEVICH, YU. A. Statistical hydromechanics of disperse systems. Part 2. Solution of the kinetic equation for suspended particles, 345

CHANG, I-DEE. *See* HARPER, GRUBE & CHANG

CLARKE, N. S. The force distribution on a slender twisted particle in a Stokes flow, 781

CORCOS, G. M. *See* SCOTTI & CORCOS

CRAPPER, G. D. Nonlinear gravity waves on steady non-uniform currents, 713

DAVIDSON, M. R. & FITZ-GERALD, J. M. Flow patterns in models of small airway units of the lung, 161

DAVIS, RUSS E. On prediction of the turbulent flow over a wavy boundary, 287

ECKERT, E. R. G. *See* PENNELL, ECKERT & SPARROW

FITZ-GERALD, J. M. *See* DAVIDSON & FITZ-GERALD

GARGETT, A. E. & HUGHES, B. A. On the interaction of surface and internal waves, 179

GEBHART, B. *See* AUDUNSON & GEBHART

GOLDSMITH, P. *See* JONAS & GOLDSMITH

GRUBE, G. W. *See* HARPER, GRUBE & CHANG

HANJALIĆ, K. & LAUNDER, B. E. A Reynolds stress model of turbulence and its application to thin shear flows, 609

HARPER, E. Y., GRUBE, G. W. & CHANG, I-DEE. On the breakup of accelerating liquid drops, 565

HINCH, E. J. & LEAL, L. G. The effect of Brownian motion on the rheological properties of a suspension of non-spherical particles, 683

HORNSTRA, D. J. *See* HOULIHAN & HORNSTRA

HOULIHAN, T. M. & HORNSTRA, D. J. Boundary-layer velocity profiles in a swirling convergent flow field, 357

HUGHES, B. A. *See* GARGETT & HUGHES

JONAS, P. R. & GOLDSMITH, P. The collection efficiencies of small droplets falling through a sheared air flow, 593

KAMEL, M. M. *See* OPPENHEIM, KUHL, LUNDSTROM & KAMEL

KAO, TIMOTHY W. & PARK, CHEOL. Experimental investigations of the stability of channel flows. Part 2. Two-layered co-current flow in a rectangular channel, 401

KOBAYASHI, RYŌJI. Note on the stability of a boundary layer on a concave wall with suction, 269

KUHL, A. L. *See* OPPENHEIM, KUHL, LUNDSTROM & KAMEL

LAI, ROBERT Y. S. & MOCKROS, LYLE F. The Stokes-flow drag on prolate and oblate spheroids during axial translatory accelerations, 1

LAUNDER, B. E. *See* HANJALIĆ & LAUNDER

LEAL, L. G. *See* HINCH & LEAL

LIGHTHILL, M. J. Physiological fluid dynamics: a survey, 475

LIN, C. H. *See* MCINTYRE & LIN

LUNDSTROM, E. A. *See* OPPENHEIM, KUHL, LUNDSTROM & KAMEL

LYNN, Y. M. *See* BERTRAM & LYNN

MCGOLDRICK, L. F. On the rippling of small waves: a harmonic nonlinear nearly resonant interaction, 725

MCINTIRE, LARRY V. & LIN, C. H. Finite amplitude instability of second-order fluids in plane Poiseuille flow, 273

MCINTYRE, MICHAEL E. On Long's hypothesis of no upstream influence in uniformly stratified or rotating flow, 209

MOCKROS, LYLE F. *See* LAI & MOCKROS

MORRISON, G. L., PERRY, A. E. & SAMUEL, A. E. Dynamic calibration of inclined and crossed hot wires, 465

MOSS, W. D. Flow separation at the upstream edge of a square-edged broad-crested weir, 307

NEREM, R. M., SEED, W. A. & WOOD, N. B. An experimental study of the velocity distribution and transition to turbulence in the aorta, 137

OPPENHEIM, A. K., KUHL, A. L., LUNDSTROM, E. A. & KAMEL, M. M. A parametric study of self-similar blast waves, 657

PARK, CHEOL. *See* KAO & PARK

PENNELL, W. T., ECKERT, E. R. G. & SPARROW, E. M. Laminarization of turbulent pipe flow by fluid injection, 451

PERRY, A. E. *See* MORRISON, PERRY & SAMUEL

ROTEM, ZEËV. On a class of magneto-convective boundary-layer flows, 43

RUDRAIAH, N. & VENKATACHALAPPA, M. Propagation of internal gravity waves in perfectly conducting fluids with shear flow, rotation and transverse magnetic field, 193

SACHDEV, P. L. Propagation of a blast wave in uniform or non-uniform media: a uniformly valid analytic solution, 369

SAMUEL, A. E. *See* MORRISON, PERRY & SAMUEL

SCOTTI, R. S. & CORCOS, G. M. An experiment on the stability of small disturbances in a stratified free shear layer, 499

SEED, W. A. *See* NEREM, SEED & WOOD

SMITH, RONALD. Nonlinear Kelvin and continental-shelf waves, 379

SMITH, RONALD. An instability of internal gravity waves, 393

SPARROW, E. M. *See* PENNELL, ECKERT & SPARROW

STEWARTSON, K. *See* BELCHER, BURGGRAF & STEWARTSON

SURRY, DAVID. Some effects of intense turbulence on the aerodynamics of a circular cylinder at subcritical Reynolds number, 543

VENKATACHALAPPA, M. *See* RUDRAIAH & VENKATACHALAPPA

WEINBERGER, H. F. Variational properties of steady fall in Stokes flow, 321

WILLIAMSON, A. S. The tearing of an adhesive layer between flexible tapes pulled apart, 639

WONG, F. Y. F. *See* BRADSHAW & WONG

WOOD, N. B. *See* NEREM, SEED & WOOD

REVIEWS

A History and Philosophy of Fluidmechanics, by G. A. Tokaty, 207

The Theory of Rotating Fluids, by H. P. Greenspan, 794

Thin Liquid Films and Boundary Layers, published for the Faraday Society, 795

SHORTER NOTICES

Fluid Mechanics for Engineers, 3rd edition, S. I. version, by P. S. Barna, 796

Fluid Power for Technicians, by D. G. Newton, 796

Shock Tube Research, edited by J. L. Stollery, A. G. Gaydon and P. R. Owen, 797

Fluid Mechanics for Civil Engineers, S. I. edition, by N. B. Webber, 797

Research in the Antarctic, edited by L. O. Quam, 797

INDEX

ACHESON, D. J. The critical level for hydromagnetic waves in a rotating fluid, 401

ACRIVOS, ANDREAS. *See* KLEMP & ACRIVOS

ANTONIA, R. A. & LUXTON, R. E. The response of a turbulent boundary layer to a step change in surface roughness. Part 2. Rough-to-smooth, 737

ATASSI, H. & SHEN, S. F. A unified kinetic theory approach to external rarefied gas flows. Part 1. Derivation of hydrodynamic equations, 417

ATASSI, H. & SHEN, S. F. A unified kinetic theory approach to external rarefied gas flows. Part 2. Application to a steady low-speed motion past a circular cylinder, 433

BEARMAN, P. W. Some measurements of the distortion of turbulence approaching a two-dimensional bluff body, 451

BLACKWELDER, RON F. & KOVASZNAY, LESLIE S. G. Large-scale motion of a turbulent boundary layer during relaminarization, 61

BRADSHAW, PETER. *See* HUFFMAN & BRADSHAW

CHARWAT, A. F., KELLY, R. E. & GAZLEY, C. The flow and stability of thin liquid films on a rotating disk, 227

CHAWLA, S. S. On hydromagnetic spin-up, 545

CRAIK, ALEX D. D. Eigenvalue bounds in linear inviscid stability theory, 657

DAVEY, A. The propagation of a weak nonlinear wave, 782

DAVEY, ROBERT F. & ROSHKO, ANATOL. The effect of a density difference on shear-layer instability, 523

DAVIDSON, B. J. & RILEY, N. Jets induced by oscillatory motion, 287

DEVANATHAN, RATHNA. *See* RAO & DEVANATHAN

ELFSTROM, G. M. Turbulent hypersonic flow at a wedge-compression corner, 113

ELLIOTT, J. A. Microscale pressure fluctuations measured within the lower atmospheric boundary layer, 351

ELTER, JOHN F. & MOLYNEUX, JOHN E. The long-distance propagation of shallow water waves over an ocean of random depth, 1

FENTON, JOHN. A ninth-order solution for the solitary wave, 257

FISCHER, HUGO B. Mass transport mechanisms in partially stratified estuaries, 671

FORTUNA, GILEAD & HANRATTY, THOMAS J. The influence of drag-reducing polymers on turbulence in the viscous sublayer, 575

FOSTER, M. R. The flow caused by the differential rotation of a right circular cylindrical depression in one of two rapidly rotating parallel planes, 647

GAZLEY, C. *See* CHARWAT, KELLY & GAZLEY

GOLDGRABEN, J. RICHARD. *See* WEINBAUM & GOLDGRABEN

HANRATTY, THOMAS J. *See* FORTUNA & HANRATTY

HICKS, BRUCE L., YEN, SHEE-MANG & REILLY, BARBARA J. The internal structure of shock waves, 85

HORNUNG, H. G. Non-equilibrium dissociating nitrogen flow over spheres and circular cylinders, 149

HORSTMAN, C. C. *See* OWEN & HORSTMAN

HUFFMAN, G. DAVID & BRADSHAW, PETER. A note on von Kármán's constant in low Reynolds number turbulent flows, 45

HUNTER, C. On the calculation of wave patterns, 637

HUNTLEY, IAN. Observations on a spatial-resonance phenomenon, 209

IMBERGER, JORG. Two-dimensional sink flow of a stratified fluid contained in a duct, 329

KAO, Y. S. & KENNING, D. B. R. Thermocapillary flow near a hemispherical bubble on a heated wall, 715

KEFFER, J. F. *See* PALMER & KEFFER

KELLY, R. E. *See* CHARWAT, KELLY & GAZLEY

KENNING, D. B. R. *See* KAO & KENNING

KLEMP, J. B. & ACRIVOS, ANDREAS. A method for integrating the boundary-layer equations through a region of reverse flow, 177

KOVASZNAY, LESLIE S. G. *See* BLACKWELDER & KOVASZNAY

LAVIE, A. M. Analysis of the swimming of elastic slender bodies excited by an external force, 701

LUXTON, R. E. *See* ANTONIA & LUXTON

MAHONY, J. J. & SMITH, RONALD. On a model representation for certain spatial-resonance phenomena, 193

MARTIN, SEELYE, SIMMONS, WILLIAM & WUNSCH, CARL. The excitation of resonant triads by single internal waves, 17

MILES, JOHN W. Internal waves in a sheeted thermocline, 557

MILES, JOHN W. Axisymmetric rotating flow past a circular disk, 689

MOFFATT, H. K. An approach to a dynamic theory of dynamo action in a rotating conducting fluid, 385

MOLYNEUX, JOHN E. *See* ELTER & MOLYNEUX

OWEN, F. K. & HORSTMAN, C. C. On the structure of hypersonic turbulent boundary layers, 611

PALMER, M. D. & KEFFER, J. F. An experimental investigation of an asymmetrical turbulent wake, 593

PHYTHIAN, R. Some variational methods in the theory of turbulent diffusion, 469

PINSENT, H. Kelvin wave attenuation along nearly straight boundaries, 273

RAO, A. RAMACHANDRA & DEVANATHAN, RATHNA. Flow of a stratified fluid in a wavy channel, 513

REILLY, BARBARA J. *See* HICKS, YEN & REILLY

REYNOLDS, WILLIAM C. *See* ZEREN & REYNOLDS

RILEY, N. *See* DAVIDSON & RILEY

ROSHKO, ANATOL. *See* DAVEY & ROSHKO

SHEN, S. F. *See* ATASSI & SHEN

SIMMONS, WILLIAM. *See* MARTIN, SIMMONS & WUNSCH

SIMPSON, JOHN E. Effects of the lower boundary on the head of a gravity current, 759

SMITH, RONALD. *See* MAHONY & SMITH

TOKUDA, N. Viscous flow near a corner in three dimensions, 129

TURNER, J. S. On the energy deficiency in self-preserving convective flows, 217

WEINBAUM, SHELDON & GOLDGRABEN, J. RICHARD. On the movement of water and solute in extracellular channels with filtration, osmosis and active transport, 481

WUNSCH, CARL. *See* MARTIN, SIMMONS & WUNSCH

YEN, SHEE-MANG. *See* HICKS, YEN & REILLY

ZEREN, RICHARD W. & REYNOLDS, WILLIAM C. Thermal instabilities in two-fluid horizontal layers, 305

REVIEWS

Thermodynamic Theory of Structures, Stability and Fluctuations, by P. Glansdorff and I. Prigogine, 400

Mechanics of Fluids, by J. W. Ireland, 587

A Textbook on Hydraulics and Fluid Mechanics, Volume I, *by V. G. Garde and R. M. Advani*, 587

Elements of Fluid Mechanics, by C. V. Seshadri and S. V. Patankar, 587

Hydronautics, edited by H. E. Sheets and V. T. Boatwright, 589

Flowing Gas – Solids Suspensions, by R. G. Boothroyd, 591